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PATENT
Docket No.: 16869S-033400US
Client Ref. No.: E6234-01 ET

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	
Tatsuya ISHITOBI, et al.	Examiner: Paul W. Huber
Application No.: 09/944,466	Art Unit: 2653
Filed: August 30, 2001	
For: METHOD AND APPARATUS FOR DISC RECORDING	COMMUNICATION

Commissioner for Patents
United States Patent and Trademark Office
2900 Crystal Drive, Room 7A32
Alexandria, VA 22202

Sir:

In response to the Notice to File Corrected Application Papers dated March 19, 2005, counsel for Assignee encloses a complete copy of the amendment dated September 13, 2004, as requested. It should be noted that a copy of this amendment was previously faxed to T. Mills (Tel. 703-305-0003 x143) at Fax No. 703-746-6836 on March 21, 2005, per a telephone request.

Respectfully submitted,

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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	

Application Number	09/944,466
Filing Date	August 30, 2001
First Named Inventor	Ishitobi, Tatsuya
Art Unit	2653
Examiner Name	Paul W. Huber
Attorney Docket Number	16869S-033400US

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Townsend and Townsend and Crew LLP		
Signature	Robert C. Colwell		
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Date	April 4, 2005	Reg. No.	27,431

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U.S. Patent & TMOfc/TM Mail Rcpt Dt. #77

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No. 2834
Tatsuya ISHITOBI, et al.	Examiner: Paul W. Huber
Application No.: 09/944,466	Technology Center/Art Unit: 2653
Filed: August 30, 2001	
For: DISC RECORDING METHOD AND APPARATUS USING OF IT	AMENDMENT
Customer No.: 20350	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action mailed May 10, 2004, on the above-referenced application, please enter the following amendments and remarks:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the Listing of Claims which begins on page 6 of this paper.

Remarks/Arguments begin on page 9 of this paper.

Amendments to the Specification:

Please replace the title with the following amended title:

~~Disc Recording~~ Method and Apparatus for Disc Recording~~Using of It~~

Please replace the paragraph on page 11, lines 5-13, with the following amended paragraph:

Fig. 1 is a system block diagram showing an optical disc device as one embodiment of the present invention. In Fig. 1, reference numeral 101 denotes an optical disc; 102 an optical pickup unit; 103 a laser driver; 104 a front end; 105 an address detector; 106 a reference clock counter; 107 a servo off detector; 108 a write gate generator; 109 an encoder; 110 an encode enable generator; 111 a data buffer; and 112 a system controller.

Please replace the six paragraphs beginning on page 12, line 4, through page 13, line 14, with the following amended paragraphs:

The optical pickup unit 102 outputs to the optical disc 101 a laser beam for recording or reproduction on or from the optical disc 101, and produces a detection signal based on a reflection from the optical disc 101.

The laser driver 103 controls a waveform of a beam outputted from the pickup unit 102. In a reproduction mode, the laser driver 103 itself controls the beam waveform and in the recording mode, the laser driver controls the beam waveform based on the recording data to which the user data was converted by the encoder 109. Switching from the reproduction mode to the record mode is performed when a write gate signal is outputted from the write gate (WR gate) generator 108.

~~The front end~~ An analog signal processor (ASP) 104 outputs a disc control signal and a data reproducing signal based on the detection signal outputted by the optical pickup unit 102. In Fig. 1, the ~~front end~~ analog signal processor 104 outputs and sends an original address signal to the address detector 105. It also generates a reference clock based on a clock signal of a wobble signal and delivers it to the reference clock counter 106. It also delivers a servo signal to the servo off detector 107.

The address detector 105 verifies the original address signal outputted by the ~~front end~~ analog signal processor 104 and produces address information to be used in the system.

The reference clock counter 106 counts for each sector the number of reference clocks outputted by the ~~front-end~~ analog signal processor 104. The count is reset at the starting point of each sector, and incremented each time a reference clock is produced. The position of the optical spot in the sector can be detected based on the count.

The servo off detector 107 determines that the servo has become disturbed when the level of a servo signal outputted by the ~~front-end~~ analog signal processor 104 has reached a predetermined level, and produces a servo off detection signal.

Please replace the paragraph beginning on page 13, line 25, through page 14, line 3, with the following amended paragraph:

The encoder 109 converts the user data inputted to the disc device to data to be recorded on the optical disc 101, and outputs the converted data. The data conversion is performed in synchronism with a reference clock outputted by the ~~front-end~~ analog signal processor 104 when an encode enable signal is outputted by the encode enable generator 110.

Please replace the paragraph on page 15, lines 7-11, with the following amended paragraph:

Reference numeral 204 denotes a reference clock produced by the ~~front-end~~ analog signal processor 104 based on a wobble signal reproduced when the optical spot passes a relevant sector. Fig. 2 illustrates production of 16 reference clocks for each sector.

Please replace the five paragraphs beginning on page 16, line 17, through page 19, line 17, with the following amended paragraphs:

When the recording stopped, the user data to be recorded in the sector is still stored in the data buffer 111. Thus, after the optical pickup unit 102 is positioned at the position where the recording stopped, the recording is re-openable.

Fig. 4 illustrates a recording image and a timing chart when the recording re-opens at the position where the recording stopped after the external cause that stopped the recording in Fig. 3 has disappeared. In order to re-open the recording, the optical pickup unit 102 need be positioned in the sector where the recording stopped. Since at this time the system controller 112 has therein saved the address information for the sector where the recording stopped, the optical pickup unit 102 can be positioned at the starting point of the

sector where the recording stopped based on the saved address information. In the present embodiment the position where the recording stopped can be actually reached from the starting point of the sector based on the count "9" of the reference clocks saved when the recording stopped.

As an actual process, the system controller 112 sets the saved address information of the sector and the count of the reference clocks in the encode enable generator 110 and the write gate 108, respectively. The pickup unit 102 is then positioned at a sector present before the sector where the recording stopped. The address detector 105 then detects the address information of the sector which the optical spot scans. The encode enable generator 110 compares the address information set therein when the recording stopped with the detected address information. When the address information set when the recording stopped coincides with the address information outputted by the address detector 105, the encode enable generator 110 determines that the sector concerned is the one where the recording stopped, and outputs an encode enable signal. The encoder 109 receives this signal, converts the user data held in the data buffer 111 to recording data, and outputs this data, the timing of which is shown by 206 of Fig. 4. The encoder 109 starts to operate at the starting point 202 of the sector which the encode enable generator 110 determined to be the sector where the recording stopped. Since the position where the recording actually stopped is a position 301 of Fig. 4, the write gate generator 108 has not yet outputted a write gate signal at this time and hence the laser driver 103 has still been placed in the reproduction mode.

As the optical spot is further advanced from the starting point 202 of the sector to its end point 203, the ~~front end~~ analog signal processor 104 outputs reference clocks, which are then counted up by the reference clock counter 106. Simultaneously, the write gate generator 108 compares the count of the reference clocks "9" set in the write gate generator 108 when the recording stopped with the count outputted by the reference clock counter 106. When the optical spot advances to a position 401, the count of the reference clock counter 106 becomes 9, at which time this count coincides with the count of the reference clocks "9" set in the write gate generator 108 when the recording stopped. Thus, the write gate generator 108 determines that the position 401 is the one where the recording actually stopped, and outputs a write gate signal.

Reference numeral 207 of Fig. 4 illustrates a behavior of the write gate signal at that time. When the write gate signal is outputted, the operation of the laser driver 103 is set in the recording mode, so that the laser driver 103 controls a beam waveform of the optical pickup unit 102 based on the data outputted by the encoder 109 already under operation. Thus, the recording is re-openable at the position where the recording stopped. Since the actual position where the recording stopped is shown by 301 in Fig. 4, the disc area between the positions 301 and 401 where the recording stopped and re-opened, respectively, is overwritten with the input data starting at the position 301, which may produce a read error in the reproduction. However, the length of the overwritten data can be controlled to within a range of error correctability of the laser driver 103 by determining the magnitude and accuracy of the reference clocks based on the error correctability of the laser driver 103.

Please replace the paragraph on page 19, line 18, through page 20, line 5, with the following amended paragraph:

As described above, by sub-dividing a basic recording unit such as a sector in the disc device of the present embodiment, the record starting position is controllable in a ~~minuter~~ more precise manner. Thus, even when the recording stops halfway during recording in a basic recording unit, the position where the recording stopped can be reached later and recording is re-openable at that position. Even when the recording that basically comprises sequential recording being performed on a relevant disc-type recording medium

Amendments to the Claims:

This Listing of Claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claims 1-4 (canceled).

Claim 5 (currently amended): A disc recording method ~~and an apparatus using the method~~ comprising: ~~the steps of:~~

starting to count clocks reproduced from each of basic recording areas~~, as a basic recording unit,~~ of the disc prescribed according to disc standards, the respective basic recording areas reproducing a same number of first clocks, or to count second clocks obtained by multiplying or dividing a frequency of the first clocks, at a starting point of the basic recording area;

adding the obtained count to an address allocated to the relevant basic recording area;

detecting a particular basic recording area of the disc and a particular position in the particular basic recording area based on a result of the addition of the count and the address; and

controlling, based on a result of the detection, a position in the basic recording area where recording starts, in units of a sub-area obtained by sub-dividing the basic recording area.

Claim 6 (currently amended): A disc recording method ~~and an apparatus using the method~~ according to claim 5 further comprising: ~~the steps of:~~

storing the count in the basic recording area recorded so far and the address of the basic recording area when the recording becomes stopped due to some external cause in the basic recording area during recording; and

locating the position where the recording stopped when the recording becomes re-openable, based on the stored address and count of the basic recording area, and continuing the recording on the disc at the located position.

Claims 7 (currently amended): A disc recording method ~~and an apparatus using the method~~ according to claim 6, wherein:

wobble signals are used as clocks reproduced by a same number from the respective basic recording areas on the disc.

Claim 8 (currently amended): A disc recording method ~~and an apparatus using the method~~ according to claim 6, wherein:

the disc-type recording medium under recording employs sequential recording basically.

Claim 9 (currently amended): A disc recording method ~~and an apparatus using the method~~ according to claim 6, further comprising~~: the steps of:~~

~~in order~~ to continue the recording on the disc at a position located based on the stored address and count of the basic recording area,

beforehand holding proper data in a data buffer corresponding to the basic recording area;

reading data corresponding to the located position from the data buffer; and

continuing to record the data on the disc.

Claim 10 (currently amended): A disc recording method ~~and an apparatus using the method~~ according to claim 6, wherein each second basic recording area is in a range correctable by an ECC (Error Correction Code) block added to data.

Claim 11 (currently amended): A disc recording method ~~and an apparatus using the method~~ according to claim 6, further comprising~~: the steps of:~~

determining a period of clocks used for control of a record starting position in the basic recording area that a read error in reproduction produced due to a deviation between a recording stopping position and a record re-opening position which in turn is due to accuracy of clocks used for control of the record starting position in the basic recording area is in a range of error correctability prescribed according to disc standards; and

eliminating the read error with aid of the error correcting ability.

Claim 12 (new): A disc recording apparatus comprising:

a reference clock counter connected to receive and count clock signals reproduced from a plurality of basic recording areas of a disc beginning at a starting point of such basic recording area, the respective basic recording areas reproducing a same number of first clock signals;

an address detector connected to detect an address allocated to the relevant basic recording area and providing it to the reference clock counter for being added to the obtained count;

a write gate generator coupled to receive signals from the reference clock generator and the address detector for detecting a particular basic recording area of the disc and a particular position in a desired basic recording area; and

an encoder/driver coupled to receive user data to be written to the disk and coupled to receive control information from the write gate generator, the address detector and the reference clock counter to control writing to a position in the basic recording area where recording starts, in units of a sub-area obtained by sub-dividing the basic recording area.

Claim 13 (new): A disc recording apparatus according to claim 12 wherein if recording is stopped due to an external cause, a count and the address of the basic recording area are stored in the basic recording area recorded up to that time when the recording is stopped, and upon restarting recording, that information is used to continue the recording on the disc at the located position.

Claim 14 (new): A disc recording apparatus according to claim 13 further comprising a data buffer for storing data corresponding to the basic recording area to enabling continuing recording on the disc at a position based on a stored address and stored count.

Claim 15 (new): A disc recording apparatus according to claim 13 further comprising apparatus for determining a period of clock signals used for control of a record starting position in the basic recording area that a read error produced due to a deviation between a recording stopping position and a record re-opening position, which period in turn is due to accuracy of clocks used for control of the record starting position in a range of error correctability, and eliminating the read error with aid of the error correcting ability.

REMARKS/ARGUMENTS

The Examiner's Action of May 10, 2004, has been received and reviewed by counsel for Assignee. In that Action claims 1-4 were rejected as anticipated by *Kanda*. Claims 5-11 were allowed.

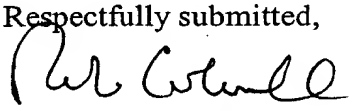
By this response counsel has canceled claims 1-4. Minor amendments to correct matters of form have been made to claims 5-11. Because no substantive changes have been made to these claims, claims 5-11 are believed allowable in accordance with the Examiner's statement.

New claims 12-15 have been added. New claims 12-15 are claims corresponding closely to method claims 5, 6, 9 and 11, but which have been rewritten in apparatus form. These new claims are believed allowable for the same reasons as claims 5-11.

In view of the foregoing, counsel for Assignee believes all claims now pending in this application are in condition for allowance. The issuance of a Notice of Allowance is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, he is invited to telephone the undersigned at 650-326-2400.

Respectfully submitted,



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Serial number 09944466

Applicant : ISHITOBI
Filing Date 08/30/01
Date Mailed : 3/19/05

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NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given 30 days from the mail date of this Notice within which to correct the informalities indicated below. A failure to reply will result in the application being ABANDONED. This period for reply is NOT extendable under 37 CFR 1.136 (a) or (b).

AMENDMENT ENDS INCOMPLETE DATED 9-13-2004 PAGE 4 OF 4

A copy of this notice MUST be returned with the reply. Please address response to "2900 CRYSTAL DRIVE ROOM 7A32 ARLINGTON, VA. 22202